

CLAIMS

1. A transmitting station in compliance with a communications method whereby a data frame is numbered with a predetermined Sequence Number before transmission, the method simultaneously involving both a NormalAck scheme and a BlockAck scheme in the receiving station returning an Ack for the data frame,

if the transmitting station transmits a data frame with a Sequence Number in the NormalAck scheme, the transmitting station transmitting no data frame with an older Sequence Number than the Sequence Number.

2. A receiving station in compliance with a communications method whereby a data frame is numbered with a predetermined Sequence Number before transmission, the method simultaneously involving both a NormalAck scheme and a BlockAck scheme in the receiving station returning an Ack for the data frame,

upon receipt of a data frame requesting the NormalAck scheme, the receiving station passing, to an upper layer, a data frame with an older Sequence Number than that of a data frame requesting the NormalAck scheme out of data frames which have been already received, but are yet to be passed to the upper layer.

3. A receiving station capable of receiving a data frame numbered with a predetermined Sequence Number and using both a NormalAck scheme and a BlockAck scheme in returning an Ack for the received data frame, said receiving station comprising:

a buffer for temporarily holding the received data frame; and

buffer control means for, upon receiving a data frame requesting the NormalAck scheme, reading a data frame with an older Sequence Number than a Sequence Number of the data frame requesting the NormalAck scheme from the buffer to pass to an upper layer and deleting the data frame from the buffer after the readout.

4. A communications method involving numbering a data frame with a predetermined Sequence Number before transmission and allowing a receiving station to simultaneously use both a NormalAck scheme and a BlockAck scheme in returning an Ack for the data frame, said method comprising the steps of:

a transmitting station, if transmitting data frames with Sequence Numbers in the NormalAck scheme, not transmitting data frames with older Sequence Number than the Sequence Numbers; and

the receiving station, upon receiving a data frame requesting the NormalAck scheme, passing to an upper layer data frames which have been already received, but are yet to be passed to the upper layer the data frames having older Sequence Numbers than the Sequence Number of the data frame requesting the NormalAck scheme.

5. A communications method in compliance with the IEEE 802.11 standard (ANSI/IEEE Std. 802.11, 1999 Edition) and the Draft IEEE 802.11e standard (IEEE P802.11e/D6.0, November 2003), said method comprising the steps of:

a transmitting station for a stream of a TID, if transmitting a QoS data frame with a Sequence Number including an Ack Policy field containing information indicating NormalAck, not transmitting a QoS data frame with a smaller Sequence Number than the Sequence Number; and

a receiving station of a stream of a TID, if having received a QoS data frame including an Ack Policy field containing information indicating NormalAck, passing to an upper layer a QoS data frame with a smaller Sequence Number than the Sequence Number of the received QoS data frame out of data frames which have been already received, but are yet to be passed to the upper layer.

6. A receiving station in compliance with a communications

method simultaneously involving both a NormalAck scheme and a BlockAck scheme in the receiving station returning an Ack for a received data frame,

5 the receiving station, if not having received a data frame requesting the BlockAck scheme within a predetermined period regardless of whether the receiving station has or has not received a data frame requesting the NormalAck scheme, regarding use of the BlockAck scheme as having been terminated and releasing resource being used for the
10 BlockAck scheme.

7. A communications method allowing a receiving station to simultaneously use both a NormalAck scheme and a BlockAck scheme in returning an Ack for a received data frame, said
15 method comprising the step of:

the receiving station, if not having received a data frame requesting the BlockAck scheme within a predetermined period regardless of whether the receiving station has or has not received a data frame requesting the NormalAck scheme,
20 regarding use of the BlockAck scheme as having been terminated and releasing resource being used for the BlockAck scheme.

8. A receiving station in compliance with a communications
25 method simultaneously involving both a NormalAck scheme

and a BlockAck scheme in the receiving station returning an Ack for a received data frame,

the receiving station, if not having received a BlockAck request frame within a predetermined period regardless of whether the receiving station has or has not received a data frame, regarding use of the BlockAck scheme as having been terminated and releasing resource being used for the BlockAck scheme.

9. A communications method allowing a receiving station to simultaneously use both a NormalAck scheme and a BlockAck scheme in returning an Ack for a received data frame, said method comprising the step of:

the receiving station, if not having received a BlockAck request frame within a predetermined period regardless of whether the receiving station has or has not received a data frame, regarding use of BlockAck scheme as having been terminated and releasing resource being used for the BlockAck scheme.

10. A receiving station in compliance with a communications method simultaneously involving both a NormalAck scheme and a BlockAck scheme in the receiving station returning an Ack for a received data frame,

the receiving station, if not having received a data frame

requesting the BlockAck scheme or a BlockAck request frame within a predetermined period regardless of whether the receiving station has or has not received a data frame, regarding use of BlockAck scheme as having been terminated and releasing resource being used for the BlockAck scheme.

11. A communications method allowing a receiving station to simultaneously use both a NormalAck scheme and a BlockAck scheme in returning an Ack for a received data frame, said method comprising the step of:

the receiving station, if not having received a data frame requesting the BlockAck scheme or a BlockAck request frame within a predetermined period regardless of whether the receiving station has or has not received a data frame, regarding use of the BlockAck scheme as having been terminated and releasing resource being used for the BlockAck scheme.

12. A communications method in compliance with the IEEE 802.11 standard (ANSI/IEEE Std. 802.11, 1999 Edition) and the Draft IEEE 802.11e standard (IEEE P802.11e/D6.0, November 2003), said method comprising the step of:

a receiving station of a stream of a TID, if not having received a QoS data frame including an Ack Policy field containing information indicating a BlockAck within the

period of BlockAck Timeout regardless of whether the receiving station has or has not received a QoS data frame including an Ack Policy field containing information indicating a NormalAck, releasing resource being used for transmission of the BlockAck.

13. A communications method in compliance with the IEEE 802.11 standard (ANSI/IEEE Std. 802.11, 1999 Edition) and the Draft IEEE 802.11e standard (IEEE P802.11e/D6.0, November 2003), said method comprising the step of:

a receiving station of a stream of a TID, if not having received a Block Acknowledgement Request Frame within the period of BlockAck Timeout regardless of whether the receiving station has or has not received a QoS data frame, releasing resource being used for transmission of a BlockAck.

14. A communications method in compliance with the IEEE 802.11 standard (ANSI/IEEE Std. 802.11, 1999 Edition) and the Draft IEEE 802.11e standard (IEEE P802.11e/D6.0, November 2003), said method comprising the step of:

a receiving station of a stream of a TID, if not having received a QoS data frame including an Ack Policy field containing information indicating a BlockAck or a Block Acknowledgement Request Frame within the period of BlockAck Timeout regardless of whether the receiving station

has or has not received a QoS data frame including an Ack Policy field containing information indicating a NormalAck, releasing resource being used for transmission of the BlockAck.

5

15. A receiving station simultaneously using both a NormalAck scheme and a BlockAck scheme in returning an Ack for a received data frame, said receiving station comprising:

10 timer; and

a timer control mechanism for resetting the timer upon receiving at least one of a data frame requesting the BlockAck scheme and a BlockAck request frame within a predetermined period; and

15 a resource control mechanism for regarding use of the BlockAck scheme as having been terminated and releasing resource being used for the BlockAck scheme when the timer has reaches a predetermined period.

20 16. A communications program describing procedures which a computer undergoes to operate as the transmitting station of either one of claims 1 and 2.

25 17. A communications program describing procedures which a computer undergoes to operate as the receiving station of any

one of claims 3, 6, 8, 10, and 15.

18. A computer-readable storage medium containing the communications program of either one of claims 16 and 17.